

REMARKS

Introduction

In response to the Office Action dated February 19, 2008, Applicants have amended claims 1, 6, 26, 28, 32, and 42. The limitations of claim 5, previously dependent upon claim 1, have been incorporated into claim 1, and claims 4 and 5 cancelled. The pertinent limitations of claim 27, previously dependent upon claim 26, have been incorporated into claim 26, and claim 27 cancelled. The pertinent limitations of claim 42, previously dependent upon claim 32, have been incorporated into claim 32, and claim 42 cancelled. Claim 6 has been amended to depend from claim 1. Claim 28 has been amended to depend from claim 26. Claim 42 has been amended to depend from claim 32. The present Amendment does not generate any issue that would require substantive further consideration. In view of the foregoing amendments and the following remarks, Applicants respectfully submit that all pending claims are in condition for allowance.

Claim Rejections Under 35 U.S.C. § 103

Claims 1, 2, 4-8, 11-14, 26-29, 31, 32, 35, and 37-42 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 7,067,206 to Uwazumi et al. ("Uwazumi") in view of U.S. Patent No. 4,888,211 to Oka et al. ("Oka").

According to the claimed subject matter per claims 1 and 26, a layer stack is formed on a surface of a non-magnetic substrate, where the layer stack includes an outermost granular magnetic recording layer formed by sputter deposition in an atmosphere with at least one reactive gas including oxygen, nitrogen, and/or carbon atoms. Following the sputter deposition,

the outermost granular magnetic recording layer has an exposed nano-scale rough and porous surface that is sputter etched.

The Office Action asserts that Uwazumi teaches a method of manufacturing granular magnetic recording media. The Office Action asserts that Uwazumi teaches providing a non-magnetic substrate including a substrate and forming a layer stack on the surface of the substrate, where the layer stack includes an outermost granular magnetic recording layer. The Office Action asserts that Uwazumi teaches a protective overcoat layer on the magnetic layer.

The Office Action acknowledges that Uwazumi does not discuss a magnetic layer having a nano-scale rough and porous surface. The Office Action admits that Uwazumi does not discuss treating the exposed surface of the granular magnetic recording layer. The Office Action acknowledges that Uwazumi does not discuss etching the surface of the granular magnetic recording layer or sputter etching. The Office Action relies on Oka in an attempt to cure the deficiencies of Uwazumi.

The Office Action asserts that Oka teaches forming a layer stack on the surface of the substrate, the layer including an outermost granular magnetic recording layer with an exposed nano-scale and porous surface. The Office Action asserts that Oka teaches treating the exposed nano-rough and porous surface of the granular recording layer to provide at least an increased microstructural homogeneity. The Examiner contends that treating can include sputter etching the surface of the magnetic layer with inert gas ions of Argon.

Contrary to the Examiner's assertions, Oka *teaches away* from the claimed sputter deposition of an outermost granular magnetic recording layer. Oka contends that the sputter method of cobalt type alloy film is conventional (col. 1, lines 25-27 and 35-36). Oka states that the sputtering method is **not suitable** for industrial production because the film-forming speed is

low and the manufacturing cost is increased (col. 1, lines 27-30 and col. 2, lines 4-20). Oka discusses that the sputtering method requires heating the substrate to a temperature of about 150° to 300°C during the formation of the film in order to improve the magnetic characteristics in the vertical direction of a Co-Cr alloy (col. 1, lines 35-39). Oka teaches other deposition techniques and adopts electron beam vacuum deposition over sputter deposition (col. 7, lines 27-39). Therefore, one of skill in this art would not have been motivated to sputter etch the outermost granular magnetic recording layer after forming this layer by sputter deposition.

The Examiner's position that it would have been obvious to one of ordinary skill in the art to substitute the technique of Oka in Uwazumi is **illogical and inconsistent**. There is **no factual basis** upon which to predicate the determination that the methodology employed by each of Uwazumi and Oka **necessarily** results in a method corresponding to that claimed, particularly employing sequential sputter deposition **and** sputter etching of the outermost granular magnetic recording layer. Specifically, Uwazumi describes sputter deposition of the outermost granular magnetic recording layer, however, Oka *teaches away* from the claimed sputter deposition of the outermost granular magnetic recording layer, so there is no basis for alleging obviousness thereof. Therefore, Oka cannot be relied upon to cure the deficiencies of Uwazumi.

As, Uwazumi and Oka do not disclose the same process of manufacturing granular magnetic recording media as disclosed by the present inventors, Uwazumi and Oka do not anticipate the method for manufacturing granular magnetic recording media, as required by claims 1 and 32.

Obviousness can be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge readily

available to one of ordinary skill in the art. *In re Kotzab*, 217 F.3d 1365, 1370 55 USPQ2d 1313, 1317 (Fed. Cir. 2000); *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). There is no suggestion in Oka to modify the deposition method of the outermost granular magnetic recording layer, nor does common sense dictate the Examiner-asserted modifications. The Examiner has not provided any evidence that there would be any obvious benefit in making the asserted modification of Oka. *See KSR Int'l Co. v. Teleflex, Inc.*, 127 S.Ct. 1727, 82 USPQ2d 1385 (2007).

The only teaching of the claimed sputter deposition method and sputter etching of the outermost granular magnetic recording layer is found in Applicants' disclosure. However, the teaching or suggestion to make a claimed combination and the reasonable expectation of success must not be based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

According to the claimed subject matter per amended claim 32, a layer stack is formed on a surface of a non-magnetic substrate, where the layer stack includes an outermost granular magnetic recording layer formed by sputter deposition in an atmosphere with at least one reactive gas including oxygen, nitrogen, and/or carbon atoms. Following the sputter deposition, the outermost granular magnetic recording layer has an exposed nano-scale rough and porous surface that is sputter etched, which reduces surface nano-scale roughness. Paragraph [0070] of the instant application states:

Specifically, the magnetic recording film or layer of sample No. 1 (i.e., **before ion etching**) **exhibits the very rough surface topology** characteristic of as-deposited granular magnetic recording films or layers, whereas **the granular magnetic recording film or layer of sample No. 4 (i.e., after 10 sec. ion etching) exhibits a very smooth surface topology attributed to the Ar ion etching** (*emphasis added*).

With respect to dependent claim 41, the Office Action characterizes the process of Uwazumi as same as Applicant's process. The Examiner contends that since the process for producing the magnetic layer is the same as Applicant's process, the nanoscale roughness is achieved.

The Examiner's Official Notice is traversed. If Official Notice is taken of a fact, unsupported by documentary evidence, then the basis for such reasoning must be set forth explicitly. The Examiner must provide specific factual findings predicated on sound technical and scientific reasoning to support his or her conclusion of common knowledge. *See*, MPEP 2144.03(B) and (C). Specifically, the Office Action provides no sound technical and scientific reasoning to support the above recited Official Notice.

The Office Action acknowledges that Uwazumi does not discuss a magnetic layer having a nano-scale rough and porous surface. The Office Action admits that Uwazumi does not discuss treating the exposed surface of the granular magnetic recording layer. The Office Action acknowledges that Uwazumi does not discuss etching the surface of the granular magnetic recording layer or sputter etching. The Office Action relies on Oka in an attempt to cure the deficiencies of Uwazumi.

In the instant case, the cited prior art is *silent* regarding the claimed sputter deposition method **and** sputter etching of the outermost granular magnetic recording layer. Further, the cited prior art is *silent* regarding the outermost granular magnetic recording layer having the nanoscale roughness that is less than 2.0 Å, so there is no basis for alleging obviousness thereof. Therefore, the cited prior art does not recognize the advantage of obtaining the nano-scale roughness of the outermost granular magnetic recording layer to be less than 2.0 Å, as required by amended claim 32. The present inventors, however, have discovered that the decrease in

surface nano-scale roughness of the outermost granular magnetic recording layer is an effect of sputter etching (*see, e.g.*, Figs. 3A, 3B, 4, 5, 6A, 6B, 7A, and 7B; and Paras.[0053], [0069], and [0072]). This unexpected result is not suggested by the cited references.

Neither Uwazami nor Oka, individually or combined, disclose or infer, "...forming a layer stack on said surface of said substrate, said layer stack including an outermost granular magnetic recording layer with an exposed nano-scale rough and porous surface, said outermost granular magnetic recording layer is formed by sputter deposition in an atmosphere with at least one reactive gas comprising oxygen, nitrogen, and/or carbon atoms; (c) sputter etching said surface of said granular magnetic recording layer with ions of an inert gas; and (d) forming a protective overcoat layer on the treated surface of said granular magnetic recording layer, wherein the nano-scale roughness of the outermost granular magnetic recording layer is less than 2.0 Å," as recited by amended claim 32.

Claims 3, 30, and 36 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Uwazumi in view of Oka, and further in view of U.S. Patent No. 6,432,563 to Zou et al. ("Zou").

The Office Action relies on Zou in an attempt to cure the deficiencies of Uwazumi and Oka. The Office Action asserts that Zou teaches a granular magnetic layer that is longitudinal for use in a magnetic medium.

The combination of Uwazumi, Oka, and Zou does not teach or infer the claimed method because Zou does not cure the deficiencies of Uwazumi and Oka. Although not relied upon to do so, Zou is *silent* regarding etching, specifically sputter etching the outermost granular magnetic recording layer, as required by independent claims 1, 26, and 32.

Claims 9, 10, 33, and 34 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Uwazumi in view of Oka, and further in view of U.S. Patent No. 7,147,943 to Ono et al. (“Ono”).

The Office Action acknowledges that Uwazumi and Oka do not discuss forming a diamond-like carbon (DLC) protective layer. The Office Action relies on Ono in an attempt to cure the deficiencies of Uwazumi and Oka. The Office Action asserts that Ono teaches forming a DLC protecting layer for a magnetic layer by ion beam deposition.

The combination of Uwazumi, Oka, and Ono does not teach or infer the claimed method because Ono does not cure the deficiencies of Uwazumi and Oka. Although not relied upon to do so, Ono is *silent* regarding etching, specifically sputter etching the outermost granular magnetic recording layer, as required by independent claims 1, 26, and 32. Dependent claims are allowable for at least for the same reasons as independent claims 1, 26, and 3, and further distinguish the claimed method.

Withdrawal of the foregoing rejections is respectfully requested.

Conclusion

In view of the above amendments and remarks, Applicants submit that this application should be allowed and the case passed to issue. If there are any questions regarding this Amendment or the application in general, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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